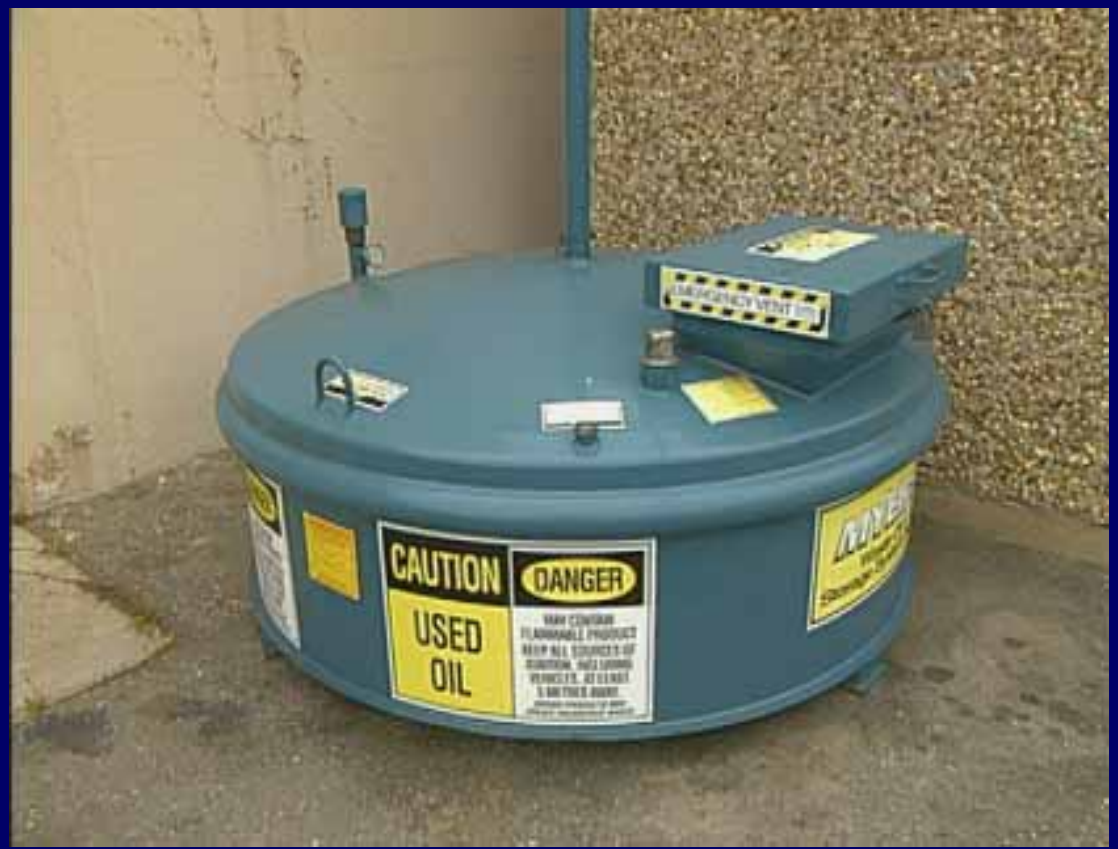
Unit 6
Engine Oil Life Extension

Baseline: "Prescribed" Oil Change

Need-it-or-not changes based on:

- **Mileage**
- **Calendar**
- **Operating Time**



Environmental Concerns

- 2.7 billion gallons of oil are sold annually
- 50% of oil is consumed and 50% is used oil
  - 31% of this “used oil” is never recycled!
- Used oil can be burned for energy or re-refined
- Burning oil results in air pollution
  - sulfur emissions
  - hydrocarbon pollutants
- 3 to 5% of used oil that is re-refined ends up as hazardous waste sludge

P2 Alternative: Oil Life Extension

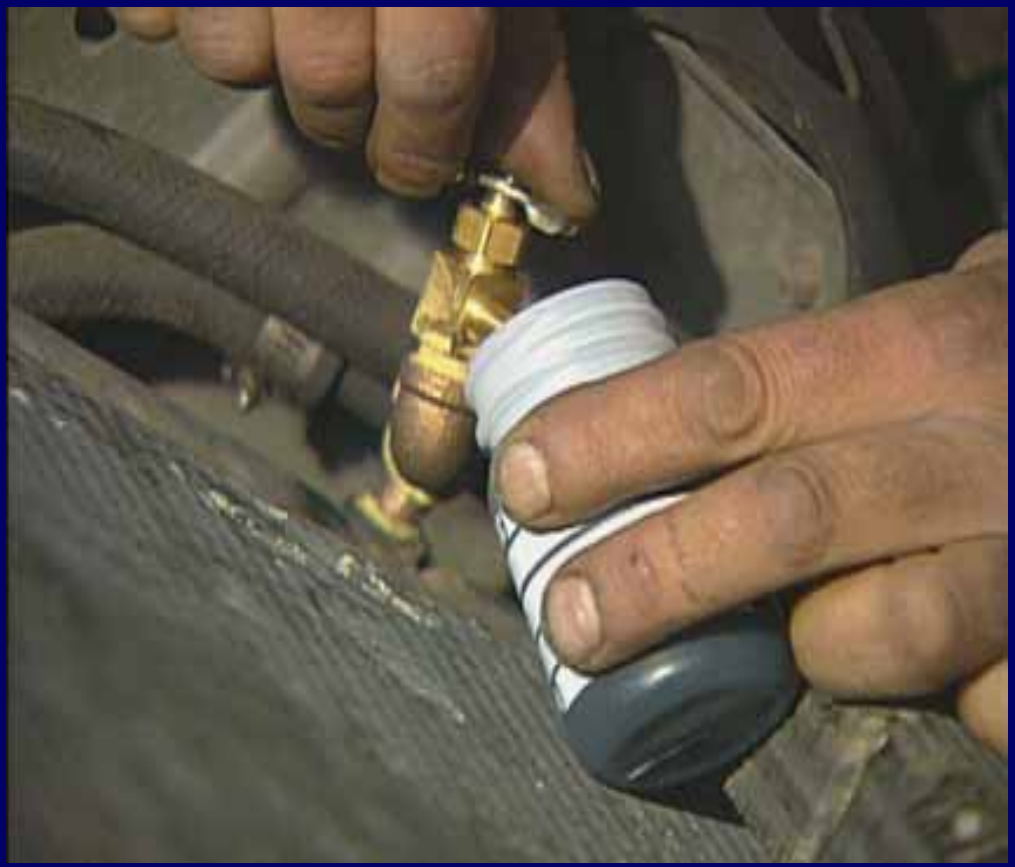
- **Successful program needs two elements:**
  - **Good baseline data**
  - **Regular sampling**
    - **Does not require much extra labor**
    - **Collect during scheduled maintenance**

Oil Life Extension: Approach

1. Select a few vehicles to monitor
2. Gather vehicle history data
3. Collect and test oil samples from 2 consecutive oil changes to establish a baseline
4. If no problems, increase interval by 25%
5. Test oil at interval and compare to baseline
6. If results are favorable, increase the interval further

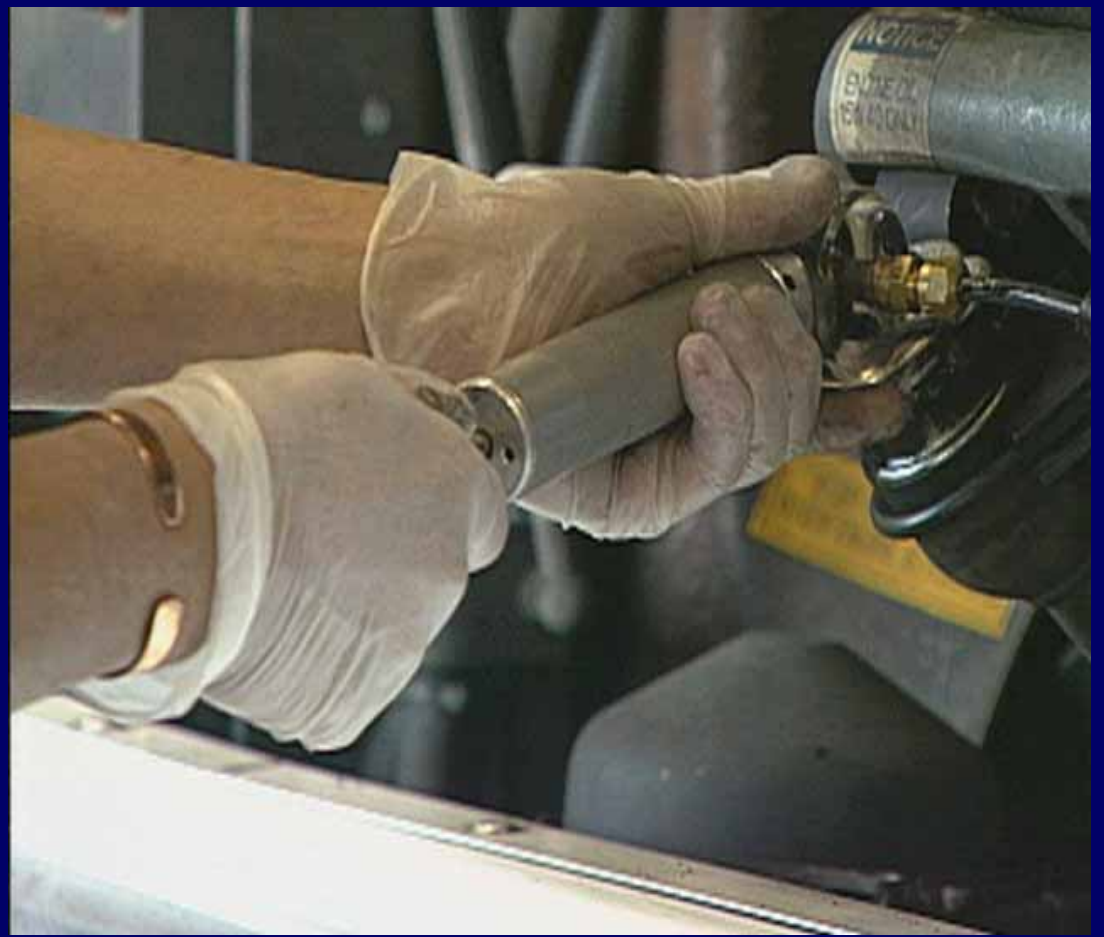
Sample Collection: Method 1

- Install a valve to draw off oil just before the filter



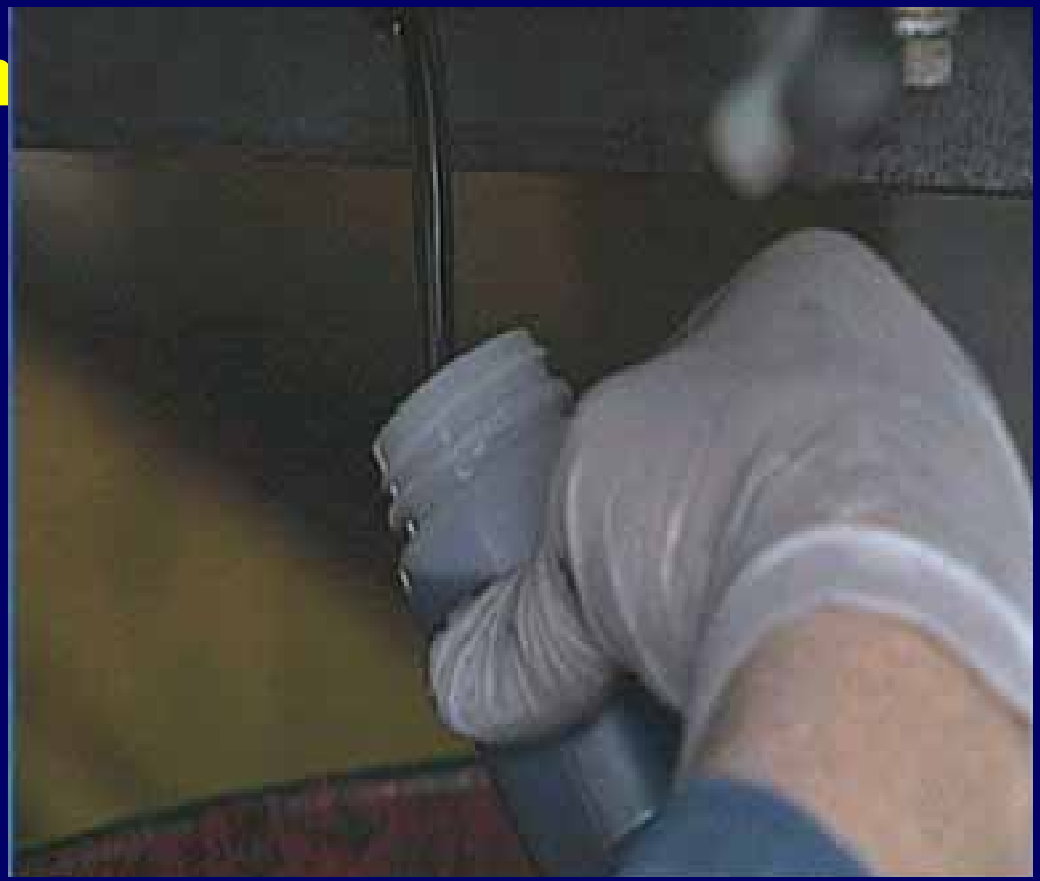
Sample Collection: Method 2

- Withdraw oil through a narrow hose inserted into the dipstick tube



Sample Collection: Method 3

- Take sample from oil when oil is changed (within 15 minutes of engine shut off)



Engine Oil Testing

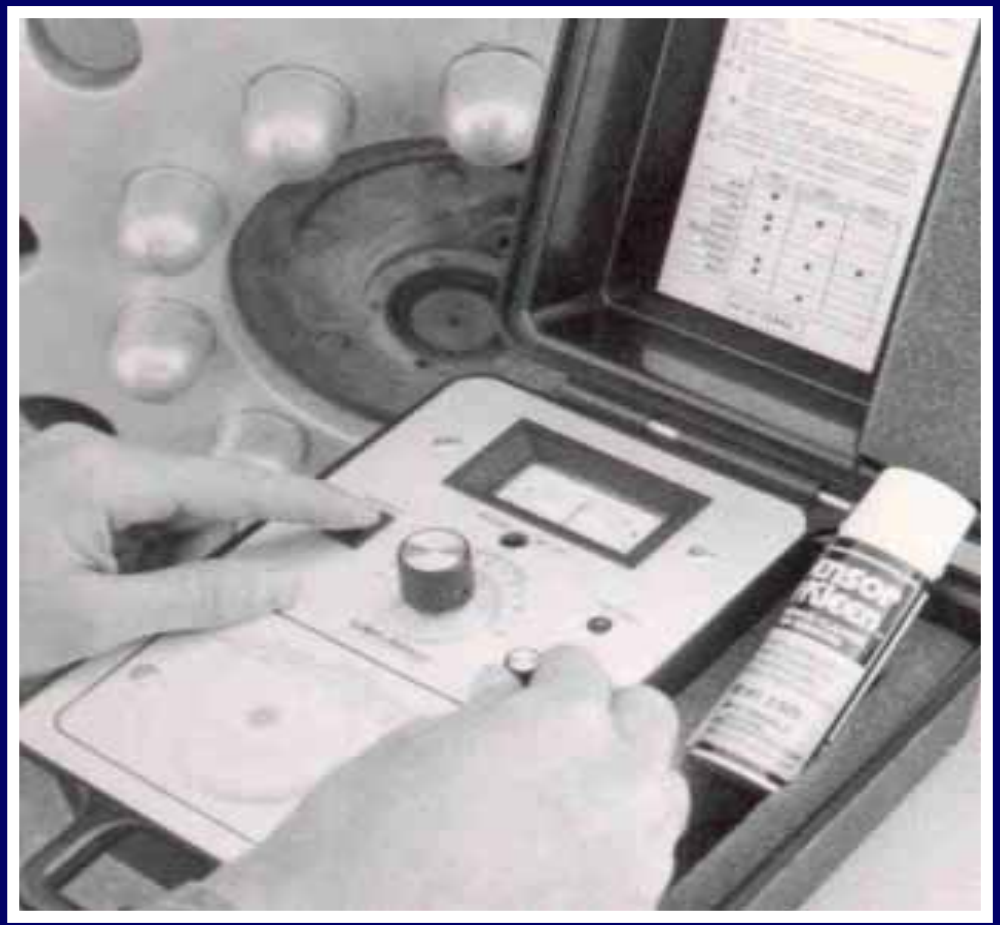
- On-site - can reduce waiting time for results and lower program costs
- Off-site - provides more testing parameters and data interpretation

Common Engine Oil Contaminants

- **Antifreeze :** *bearing damage; piston, ring, liner wear*
- **Fuel:** *lowers viscosity, bearing failure*
- **Sand and dirt (silicas):** *abrasive wear on engine parts*
- **Water:** *formation of metal-corroding acids*
- **Metals:** *engine wear particles from various sources*

On-Site Test Method: Dielectric Constant

- Dielectric constant changes as engine oil breaks down or becomes contaminated
- Easy, accurate, and quick
- Unit cost: $600 – $700



Case Study 1: Eielson AFB

- Fleet = 800 vehicles (trucks, vans, and heavy machinery)
- Use a CSI #5100 for on-site testing *(cost = $8k)*
- 40 to 60 samples per month
- Analyze for silica, iron, and metal
- Average oil change interval has tripled
- Oil purchase and disposal reduced by 87%
- Payback: 4 months

Case Study 2: Hickam AFB

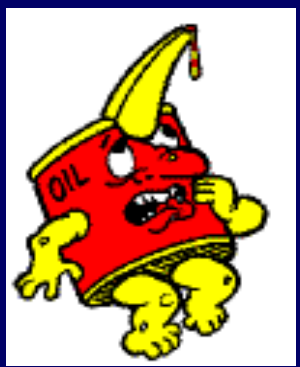
- Fleet = 659 vehicles (trucks, vans, and cars)
- Test on-site with CSI #5100, previously used LubriSensor
- 45 samples per month tested for silica, metals, ferrous materials, and water
- Oil change interval doubled
- Oil disposal and purchase reduced by 46%
- Payback: 1 1/2 years

Case Study 3: City of SF

- 14 passenger cars
- Test off-site for silica, metals, ferrous materials, fuel, and water
- Used to predict potential extension
- Can extend change interval 25-50%

Take Home Messages

- Oil testing is more than P2 – it is PM!
- Easier than you may think
- On-site testing is a good starting point
- Talk to local labs!



Re-refined Oil

Re-refined Oil Facts

- Re-refining is energy efficient
- API certified re-refined oils comply fully
- Good as or better than virgin oil
- Price is comparable to virgin oil
  - Group procurement agreements can save $

Fleet Users

- CHP
- City of Woodland
- USPS > 100,000 vehicles
- CalTrans
- DGS
- City of San Francisco
- Defense Supply Ctr. Richmond - US DOD

Procurement

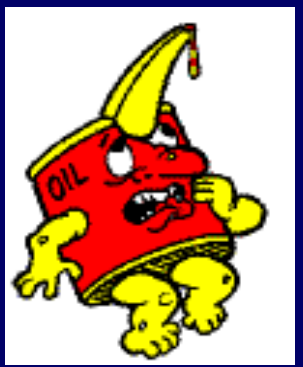
- Federal and State Agency procurement
- State Agency requirements: SABRC
  - Guidance Manual:
  - Recycled Content Product Database

Procurement (Con't)

- State and local agencies can use
- DGS Procurement Division
  - Contract #1-96-91-03, lube oil & grease
  - Contact: Dianne Cardona (916) 445-9476

Take Home Messages

- Stable TBN
- Comparable costs
- Oil does not wear out
- Oil - Non-renewable source



Help Save Me!